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Fort Drum's Antifreeze Recycling and Fuel Blending Programs Save Money, Prevent Pollution

Each year, Fort Drum supports the mobilization and training of nearly 80,000 troops, including those from the 10th Mountain Division (Light Infantry), National Guard and Army Reserves. It is the role of the Environmental Division, Public Works, to strike a healthy balance between providing the 10th Mountain Division with the training support they require, while at the same time, minimizing harmful impacts to the environment by reducing the amount of hazardous waste generated by the training mission.

"Being a sound environmental steward is an important part of Fort Drum's mission," said Jim Haynes, Chief of the Environmental Division. "Our pollution prevention (P2) program is continually evaluating new methods and processes that are more friendly to the environment by reducing the amount of hazardous waste produced by the installation."

Antifreeze Recycling Program

In April of 2001, the Environmental Division's P2 program began implementation of an antifreeze recycling program that has not only saved the installation money, but has also reduced the amount of hazardous waste disposed of by Fort Drum.

Per the Army's Hazardous Waste Minimization (HAZMIN) Policy, all Army installations must reduce the quantity and toxicity of hazardous wastes generated by antifreeze products. Ethylene glycol-based antifreeze, which is used in most military ground vehicles and accounts for approximately 90% of the antifreeze utilized on Fort Drum, may be recycled rather than disposed of thus reducing the costs of disposal as well as enhancing raw material conservation.

Each motor pool on post collects used ethylene glycol-based antifreeze during regular vehicle maintenance. When a 55-gallon drum is full of used antifreeze, a hazardous material/hazardous waste (HM/HW) technician from the Environmental Division collects the drum for recycling rather than disposal.

P2 INITIATIVES AT FORT DRUM

The recycling process is not complicated or time-intensive, said Tony Rambone, P2 project manager.

A recycling unit acts as a distiller and boils the sludge and water from the ethylene glycol, separating it into 55-gallon drums. The 'distilled' antifreeze is then treated with an inhibitor to bring it within the required military specifications. The end recycled product is equivalent in performance and chemical compatibility with virgin military antifreeze CID-A-A-52624.

The entire recycling process takes 20-24 hours to complete.

Samples from each drum are sent to the Petroleum Test Facility in Pennsylvania for testing, which takes about two weeks on average, said Rambone. Once the antifreeze meets mil specs, the drums are delivered to Fort Drum's Hazardous Material Control Center (HMCC) to be issued, free of cost, to 10th Mountain Division units as well as to the NY/NJ National Guard.

In the one year since the program began, the Environmental Division has collected 141 drums (7,755 gallons) of used antifreeze and given 23 drums of approved recycled antifreeze to the HMCC for issuance. The "free antifreeze" program appears to be well-received by the motor pools.

"We haven't had any complaints about the performance of the antifreeze," said Cliff Lashway, HMCC site manager. "But, initially we received complaints about the color, which was brownish-green rather than the bright green the soldiers are accustomed to seeing."

Each drum is clearly labeled to identify it as recycled product, said Lashway. Furthermore, each drum also contains the analysis showing that the product meets mil specs. The actual color of the antifreeze does not affect functionality or performance of the antifreeze.

However, to alleviate concerns about the brown tint, the P2 program purchased dye, which is injected as part of the inhibitor and restores the bright green color to the recycled antifreeze.

"If that makes everyone happy, it's simple enough to do and does not add substantial cost to the process," said Rambone.

A transition such as this one takes time. For the immediate future at least, the HMCC will keep 30-40 drums of virgin anti-freeze on hand at all times.

"Right now, even though we have two recycling units, we can't produce enough recycled antifreeze to keep up with demand," said Rambone. This is due in part to the ratio of used antifreeze needed to produce recycled antifreeze.

It takes approximately four 55-gallon drums of used antifreeze to make one 55-gallon drum of recycled antifreeze, said Rambone. There is also the time involved to send a sample of the recycled product to the petroleum lab and wait for the test results. There are currently 14 drums of recycled antifreeze awaiting approval from the lab.

"In some cases, the results of the sample test show that the antifreeze does not meet mil spec," said Rambone. "In that case, we can still work with that same drum to get it within spec and send another sample to the lab. It just takes more time."

The benefits of utilizing recycled antifreeze are far reaching. First, there are the cost savings to Fort Drum.

In its first year, the program cost the Environmental Division $3,900[1] to implement. Units benefited by avoiding $5,100 in virgin antifreeze purchases and Fort Drum saved $31,600 in used antifreeze disposal, representing an overall net cost savings of $32,800. During this time period, more than half of the 10th Mountain Division was deployed. Therefore it is reasonable to assume net cost savings to increase as the number of troops training on post multiplies.

In addition to the monetary savings achieved through buying less virgin antifreeze and paying less in disposal costs, there are also benefits to the environment. Recycling antifreeze reduces the pounds of hazardous waste generated and disposed of by Fort Drum and by utilizing recycled antifreeze, Fort Drum helps to conserve the earth's raw materials and natural resources.

Fuel Blending Program

Buoyed by the success of the antifreeze recycling program, Fort Drum has recently implemented yet another recycling strategy, this time involving used motor oil.

Based on recommendations from the National Automotive Center (NAC) and Tank-Automotive & Armaments Command (TACOM), the U.S. Army has initiated work to implement motor oil reutilization programs Army-wide. Two years of study at Fort Irwin, that included cost/benefit analysis, emissions

testing, engine durability testing and field testing, proved that used oil reutilization was a sound waste reduction and cost avoidance initiative.

[1]The two antifreeze recycling units were given to Fort Drum free-of-charge during the Army's testing phase of this process in the late 1990's.

Selected by the Army as a beta site in March 2001, Fort Drum's P2 program analyzed the feasibility of implementing a fuel blending program to recycle used motor oil on Fort Drum. One year later, Fort Drum officially launched its oil reutilization program on post.

"We began with two fuel blenders, given to us free-of-charge, for being a beta site," said Tony Taranto, P2 program manager. "However, we launched the program in March 2002 with 11 fuel blending machines in operation at several motor pools on Fort Drum."

The fuel blending process transforms used oil into usable fuel and subsequently reduces the need for used motor oil collection and disposal. Currently, Fort Drum is only recycling used oil retrieved from heavy mobile multi-purpose wheeled vehicles (HMMWVs) and heavy expanded mobility tactical trucks (HEMTTs) while awaiting approval on other wheeled vehicles.

The process is a simple one, implemented by automotive wheel mechanics onsite at the motor pools, said Taranto. The P2 program is responsible for educating the mechanics on fuel blending and for routine maintenance of the fuel blending machines.

During the process, a tote collects motor oil as it is drained from an engine during maintenance. Fuel is siphoned from the tank directly into the fuel blender where it is combined with the motor oil, filtered to remove any solids, blended together and returned to the vehicle fuel tank. The mechanic then replaces the drain plug, changes the oil filter on the vehicle and fills the crankcase with new oil.

It takes one minute per quart of oil to adequately blend with the fuel. Overall, the process takes approximately fifteen minutes, depending upon the amount of oil being recycled.

"It is short process and relatively simple, yet Fort Drum can reap many benefits in return," said Taranto.

First, the fuel value of the oil is recouped by utilizing the used motor oil as fuel. For every gallon of used oil that is blended back into a vehicle, one less gallon of fuel is needed by Fort Drum. "The cost of two

gallons of fuel is saved each time the oil is changed on a HMMWV," said Taranto. "With the number of vehicles in operation on post, that savings will add up over time."

Fort Drum projects pure fuel consumption to decrease, due to this process, by approximately $61,000 per year (at today's prices).

Additionally, the need for used motor oil collection from these two types of vehicles is virtually eliminated. Therefore, the cost of hazardous motor oil waste disposed of by Fort Drum is reduced proportionately. "Based on the number of oil changes conducted on HMMWVs and HEMTTs last year, we estimate a savings of $25,000 per year in used oil disposal," said Taranto. "Concurrently, significant cost savings will be realized through reduced management, collection and storage of used oil."

Overall, Fort Drum projects it can achieve cost savings of $86,000 per year with the fuel blending program.

"This program has only been underway for one month," said Taranto. "It will be 6 months or so before we can effectively gage its success, as well as learn where else on post we can apply the fuel blending process."

Feedback from the units on the ease of recycling oil, statistics on how many oil changes are actually conducted per year, and the quantity of oil recycled are key bits of information the P2 program seeks. Taranto hopes the program can be expanded to include other wheeled vehicles and perhaps track vehicles as well.

"Overall, both the antifreeze recycling and fuel blending programs are viable means of waste reduction on Fort Drum," said Haynes. "Furthermore, they are environmentally sound cost avoidance initiatives that support the training mission while helping to protect the environment."

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Photo taken by Karen Freeman, Fort Drum

Caption: Tim Aubin, service technician for Fort Drum's Environmental Division, explains how the antifreeze recycling machine filters out sludge, debris and water from used antifreeze.

Photo taken by Karen Freeman, Fort Drum

Caption: A 55-gallon drum of used antifreeze is transferred into the distiller. Within 20-24 hours, water and sludge is separated from the ethylene-glycol.

Photo taken by Tony Rambone, Fort Drum

Caption: Used motor oil collected in a tote (on left) is blended with fuel siphoned from the vehicle. After being combined together, the fuel and recycled motor oil mixture is returned to the vehicle fuel tank.

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